

# **Influence on Transport of Fissile Material by Proposed Changes to TS-R-1**

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**IAEA**

International Atomic Energy Agency

# Revision of TS-R-1

- Regulation for the Safe Transport of Radioactive Material 2009 Edition (TS-R-1) is under revision
- Over 200 proposals were received
- The key issue : Transport of fissile material (excepted)

# Intention of Changes

- To simplify regulations;
- To improve safety
- To support flexibility

# Classification of Fissile Material

TS-R-1, 2009

**Non-fissile**

**Fissile excepted**

**Fissile**

TS-R-1, 20xx

**Non-fissile**

**Fissile excepted**

**CSI controlled Fissile**

**Fissile**

# Factors Influencing the Classification of Fissile Material

- Enrichment;
- Mass per package;
- Mass per conveyance;
- Smallest external size

# Effect of changes

- One single control mechanism (CSI)
- Less focus on front-end
- Front-end also improved (5%)

# Influence by Enrichment --

U-235, 15 g/Package, 300 g/conveyance, 10 cm

FE-Fissile Excepted, CSI-CSI-controlled fissile, EP-Excepted Package

Enrichment %	2009 Edition	20xx Edition
1	FE/EP	FE / EP
1.5	FE/EP	CSI / IP-1,IP-2
5	FE/EP	CSI / IP-3, Type A
10	FE/EP	Fissile / F package
20	FE/EP	Fissile / F package
100	FE/EP	Fissile / F package

# Influence by Mass per Package

5% enrichment, 150 g / conveyance, 10 cm

Mass (g)/Package	2009 Edition	20xx Edition
10	FE/EP	CSI / IP-1,IP-2
15	FE/EP	CSI / IP-1,IP-2
30	Fissile/F package	CSI / IP-1,IP-2
40	Fissile/F package	CSI / IP-3, Type A
75	Fissile/F package	CSI / IP-3, Type A
80	Fissile/F package	Fissile / F package



# Influence by Mass per Conveyance

5% enrichment, 3.5 g / package, 10 cm

Mass (g)/conveyance	2009 Edition	20xx Edition
45	FE/EP	FE/EP
150	FE/EP	CSI / IP-1,IP-2
380	FE/EP	CSI / IP-3, Type A
400	FE/EP	Fissile/ F package
500	Fissile/F package	Fissile/ F package

# Influence by Smallest external size

5% enrichment

## Maximum mass – package / conveyance

Package	Smallest external size	Smallest external size
	10 cm	30 cm
EP	3.5/45	3.5/45
IP-1, IP-2	30/154	
IP-3, Type A	15/385	77/385

# Example 1: 5%, U-235

Mass (g) Package/Conveyance	Package size (cm)	2009 Edition	20xx Edition
3.5/45	10	Fissile excepted	Fissile excepted
15/154	10	Fissile excepted	CSI-controlled (a)
15/384	10	Fissile excepted	CSI-controlled (c)
32/154	10	Fissile	Fissile
32/385	30	Fissile	CSI-controlled (b)

# Example 2: 5% U-235

Mass (g) Package/Conveyance	Size (cm)	2009 Edition	20xx Edition
3.5/45	10	Excepted package	Excepted package
15/154	10	Excepted package	IP-1, IP-2
15/385	10	Excepted package	IP-3, Type A
32/154	10	Fissile package	Fissile package
32/385	30	Fissile package	IP-3, Type A

# Requirements for Fissile Material

- **Package control;**
- **Consignment control ;**
- **Transport control ;**

# Package control for Fissile Material

Requirements	FE	CSI	Fissile
Basic requirement for FM		Yes	Yes
Package design for FM			Yes
Integrity under NCT		Yes	
Smallest external size	Yes	Yes	Yes
Approval of fissile exception	Yes for 417 (f)		
Identification with "F"			Yes

# Consignment control for Fissile Material

<b>Requirements</b>	<b>FE</b>	<b>CSI</b>	<b>Fissile</b>
Mass limit	Yes	Yes	Yes
No fissile material different from package design		Yes	Yes
Labelling of CSI		Yes	Yes
Labelling of mass of fissile nuclides		Yes	Yes

# Transport control for Fissile Material

1/2

<b>Requirements</b>	<b>FE</b>	<b>CSI</b>	<b>Fissile</b>
UN number	Non-fissile	Fissile	Fissile
CSI control		Yes	Yes
Tamper-evident seal		Yes	Yes
Content of transport document		Yes	Yes
Content of consignment notification		Yes	Yes



# Transport control for Fissile Material

2/2

Requirements	FE	CSI	Fissile
Check-up before shipment		Yes	Yes
Segregation		Yes	Yes
Approval of shipment for $CSI \geq 50$		Yes	Yes
Unpackaged fissile material	Yes	N/A	N/A

**Thank you**

**The future**

**Working together**